Topics: User-defined function

Reading (ML): Sec 5.1, 5.2
Optional Reading: Sec 5.3-5.7

General form of user-defined function

```
function [outarg1, outarg2, ...] = fname(inarg1, inarg2, ...)
% H1 comment line
% Other comment lines

executable code
```

Example: find prime numbers (again!)

Script file `savePrime.m`:

```matlab
% Save prime numbers in [2,n] to vector prime

n = input('Enter number: ');
prime = 2; % vector to store prime #s
i = 3; % next number to be checked
while (i<=n)
    % check number i, save if prime
    % go to next number
    i = i+1;
end
prime
```

Function file `isPrime.m`:

```matlab
function out = isPrime(n)
% Determine if n is prime, n>=2
% out <-- n if n is prime
% out <-- [] if n is composite

divisor = 2;
while ( mod(n,divisor) ~= 0 )
    divisor = divisor + 1;
end
if ( divisor==n )
    else
end
```

Be sure you understand the example on p. 194 in Chapman.
Global Memory

- Global memory can be accessed from any workspace
- Global variable must be declared to be global before it is used for the first time in a function.

```
global variable1 variable2 ...
```

Persistent Memory

Persistent memory can be accessed from within the function only and is preserved unchanged between calls to the function.

```
persistent variable1 variable2 ...
```

Aside: creating vectors through concatenation

```
% Add vectors a and b
n = length(a);
c = zeros(1,n); % unnecessary statement but improves performance
for i = 1:n
    c(i) = a(i) + b(i);
end
```